REMARKS/ARGUMENTS

The prior claims 1, 4-9, 12, 13, 15, 18-24 and 30-32 have been cancelled without prejudice and replaced with claims 33 to 64. Claims 33-42, 45-60 and 64 include the elected species of hexamethylene as bridge chain or heaxmethylenediisocyanate as the connecting material. It is noted that Shastri et al. discloses a cyanate group in [0037] which has a different chemical structure from an isocyanate group.

Claims 43, 44 and 61-63 are directed to the non-elected species and therefore stand withdrawn from consideration until allowable subject matter is found in the generic claims. In this event, Applicant requests examination of the non-elected species in the generic claims and corresponding dependent claims.

Applicant claimed priority to Korean Application No. 10-2003-0004453 filed January 23, 2003 in the PCT application and at the time of entry into the National Stage in the U.S. A certified copy was filed in the PCT application and receipt of the certified copy was acknowledged in the Office action mailed October 7, 2007.

Applicant encloses an English translation of the Korean application. As stated on page 3 of the translation, the English translation is a true translation of the above Korean priority application. The priority date is prior to the earliest filing date of Shastri et al. which was cited in the rejections of the claims in the Final rejection.

Claims 33-46 are directed to subject matter which is supported in the Korean priority document and the U.S. application as filed. Claims 47-64 are directed to subject matter, including a specified particle size of the silica particle which is supported by the U.S. application as filed. No new matter has been added.

Status of the Claims

Claims 33-64 are pending. Claims 1, 4-9, 12, 13, 15, 18-24 and 30-32 are cancelled by this Amendment. Claims 42-44 and 61-63 stand withdrawn from consideration as being directed to non-elected species.

Statement of the Rejections

Previous claims 1, 4,-9, 12, 13, 15, 18, 21, 23, and 30-32 were rejected under 35 U.S.C. §103 as unpatentable over Shastri et al. The reference discloses a three-dimensional construct of a nanoparticle and a polymeric construct which presents biological information to a cell or a tissue. Among the discloses nanoparticles is SiO_2 and a silane coupling agent is disclosed as a chemical functional group preferably attached to the surface of the nanoparticle. The nanoparticles are further treated to provide a monomolecular layer to carry biological information to a cell or tissue. Examples of such a layer include polymers and inorganic materials.

In the Final rejection, the examiner took the position that the "selection of the bridge chain groups is obvious given the functional polymers and groups intended to be coupled onto the silica particle" and that the "claimed bridge chain groups are disclosed and their selection is prima facie obvious". In the Advisory action, the examiner maintained the Final rejection repeating his position and stating that "[T]he fact that these are of higher molecular weight or polymeric is not germane to the patentability of the claims".

Applicants' Traversal

Applicants traverse the rejections and respectfully request reconsideration in view of the following discussion.

Applicant has perfected his claim to the Korean priority date which is prior to the earliest date of Shastri et al. so the reference is not available as a reference against claims to 33-46

Applicant has claimed priority to Korean Application No. 10-2003-0004453 filed January 23, 2003 in the PCT application and at the time of entry into the National Stage in the U.S. Receipt of the certified copy was acknowledged by the examiner in the first Office action. Applicants.

Enclosed is an English translation of the Korean application. The translation is a true English translation of Korean Application No. 10-2003-0004453 as indicated the statement on

page 3 of the translation. Applicant has met the requirements for perfecting his claim to priority to the filing date of the Korean application. The earliest effective filing date of Shastri et al. is the filing date of the provisional application on March 28, 2003 which is after Applicant's priority date. Therefore, Shastri et al. is not available as a reference against claims 33-46 of which claims 33-42, 45, and 46 are currently under consideration.

The prior rejection over Tanaka et al. was withdrawn after the presentation of amended claims which included particle size. Claims 33-43, 45, and 46 are not limited by particle size of the silica particle. Tanaka et al. does not teach or suggest the networked silica of these claims because, as disclosed by Tanaka et al. in col. 3, lines 47-62, the silica particles are directly bonded to each other. The reference does not teach or suggest connecting the silica particles by means of any bridge chains or connecting materials. Silica particles produced by any of reactions 1), 2), or 3) are not disclosed or suggested by Tanaka et al.

Shatri et al. does not established a prima facie case of obviousness of claims 47 to 60, and claim 64

When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

(A) The claimed invention must be considered as a whole;

(B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;

(C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and

(D) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

In *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537, 218 USPQ 871, 877 (Fed. Cir. 1983), the Court noted that "the question under 35 U.S.C. § 103 is not whether the differences [between the claimed invention and the prior art] would have been obvious" but "whether the claimed invention *as a whole* would have been obvious." (emphasis in original).

MPEP §2143 states the basic requirements of a *prima facie* case of obviousness citing supporting case law:

1 There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one skilled in the art to modify the references or combine reference teachings. (see MPEP §2143.01)

2. There must be a reasonable expectation of success. (see MPEP §2143.02)

3. The prior art reference (or references when combined) must teach or suggest all of the claim limitations. (see MPEP §2143.03)

The fact that references can be modified or combined is *not* sufficient to establish *prima facie* obviousness. (MPEP §2143.01). The fact that the claimed invention may be within the capabilities of one of ordinary skill in the art is *not* sufficient by itself to establish *prima facie* obviousness.

Differences Between the Prior Art and the Claimed Invention

The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103(a) are set forth in set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966) and include determining the scope and contents of the prior art and ascertaining the differences between the prior art and the claims.

Applicant's networked silica particles are attached through bridge chains or connecting material. The elected bridge chain is hexamethylene and the elected connecting material is hexamethylene diisocyanate. The bridge chains are the reaction product of the end groups of functionalized silica particles with the end groups of silica particles having different end groups or the reaction product of a reactive end groups of functionalized silica particles with a connecting material or the reaction product of silica particles with connecting materials. The network structure of the particles is shown in Fig. 1. Such reactions do not lead to the formation of a coating around the silica particles as is required of the particles of Shastri et al. as shown in Fig. 1 of the reference.

Shastri et al. disclose a three-dimensional construct including a polymer matrix and a nanoparticle which is coated with at least two monomolecular layers for carrying biological

information and is dispersed in the polymeric matrix. The nanoparticle can have an inorganic structure which can be SiO_2 which is functionalized with chemical groups which include a variety of groups listed in [0037] of the reference. A silane coupling agent is listed but there is no teaching of a diisocyanate which has a different chemical structure than cyanate which is disclosed in [0037]. The nanoparticles are further treated to provide at least one monomolecular layer by coating the particles with collagen, hydroxyapatite, or polymers such as polyacrylic acid as disclosed in [0057]. The reference does not teach the reaction of functionalized silica particles with each other or with connecting materials such as hexamethylene diisocyanate. There is no teaching or suggestion of reactions which would result in the network structure produced by the reactions set forth in Applicant's claims.

There is no motivation or suggestion in Shastri et al. to connect the silica particles with materials such as Applicant's bridge chains or connecting materials

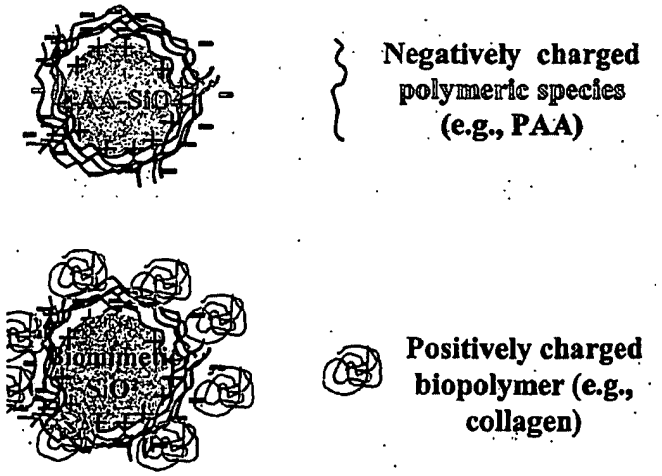
Shastri et al. does not teach or suggest the networked silica particles of the claimed invention. The functionalized nanoparticles of the reference are produced by attaching a chemical functional group to the nanoparticle's surface as disclosed in [0037]. There is no disclosure of a hexamethylene bridging chain or a diisocyanate connecting material. The cyanate group disclosed in [0037] has a different chemical structure than isocyanate. The generic disclosure of silane coupling agents among a long list of other chemical functional groups would not motivate one skilled in the art to select chemical functional groups which contain hexamethylene chains. Silane coupling agents typically contain propyl chains. Since the functionalized nanoparticles do not react with each other in Shastri et al., hexamethylene bridge chains are not produced.

The networked silica particles of claims 49-56 are produced by the reaction of silica particles with different functional groups which react with each other to form the network of the present invention. There is nothing in Shastri et al. which teaches or suggests such a network or any method by which such a network would be produced. The functionalized nanoparticles are not intended to be reacted with each other. As disclosed in [0041], the functionalized

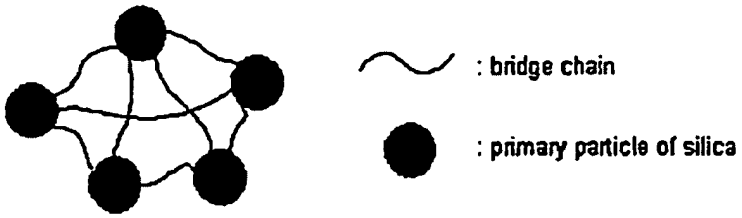
nanoparticles are further treated to provide at least one monomolecular layer of biological information. Complete coverage of the nanoparticle is preferred.

The three dimensional construct of Shastri et al. comprises the nanoparticles dispersed in a polymeric matrix, examples of which are listed in [0055] to [0058]. The use of organic monomeric materials is not disclosed or suggested. Applicants submit that there is nothing in Shastri et al. which would lead one skilled in the art to expect that the bridge chains or connecting materials of Applicant's claims would be capable of carrying biological information as required by Shastri et al.

In the Advisory action, the examiner took the position that the fact that the monomolecular layer of Shastri et al. was "of higher molecular weight or polymeric is not germane to the patentability of the claims" since [T]here are no claim limitations that patentably distinguish the claimed product from that of the prior art". Applicants submit that the network created by coating a layer of polymeric material on the individual silica particles is quite different from the silica particles produced according to the present claims. The particles of Shastri et al. are attached to a polymer matrix, not to each other. As shown in its Figure 1 below, each particles is shown as coated with the negatively charged species which then attaches to positively charged biopolymer:



The particles of the present invention are attached to other silica particles by means of bridge chains and connecting means which are not disclosed in Shastri et al. The resulting network as illustrated in Figure 1 below of the application is quite different from the network of Shastri et al.



Shastri et al. do not provide a sufficient basis for a reasonable expectation of success

As discussed previously, Shastri et al. teaches that the functionalized nanoparticles are completely or partially coated by the monomolecular layer. One skilled in the art would not have a reasonable expectation of coating the nanoparticles with the connecting materials of Applicant's claims in the manner required by Shastri et al. Applicant submit that the particles according to the present invention would not be expected to carry the biological information required by Shastri et al. from the disclosure therein. When the particles are connected to each other in the manner according to Applicants' claims using the bridge chains or connecting materials of the claimed invention, one skilled in the art would not expect them to perform according to Shastri et al. and perform the essential function of carrying biological information. Therefore, one skilled in the art would not have a reasonable expectation of success to achieve the objective Shastri et al. to provide nanoparticles which are capable of carrying biological information without the use of the polymeric or inorganic materials disclosed therein.

The claims which depend on independent claims 47 and 57 recite bridge chains or connecting means which are not disclosed in Shastri et al. As discussed previously, the network resulting from the reactions recited in the dependent claims are not disclosed or suggested by Shastri et al.

Applicants submit that a review of the prior art of record as a whole shows that the claims in the present application meet the requirements for patentability. It is respectfully requested that the Examiner continue examination to the unelected species and allow claims 33 to 64.

Respectfully submitted,

SEO ET AL

BY _____

Maria Parrish Tungol
Registration No. 31,720
Telephone: (571) 275-1111